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LISTS OF SPECIES

Neritic Jellyfishes (Cnidaria: Cubozoa and Scyphozoa) from the coast of Rio Grande do Norte state, northeast of Brazil

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Abstract
For the entire Brazilian coast, there are 22 published records of scyphozoans. On the other hand, only 35 species of cubozoans were described worldwide, four of them reported for the Brazilian coast. However, little is known about the species of cubozoans and scyphozoans in the Northeastern states of Brazil. The aim of this study was to perform a survey of the jellyfish (Cnidaria: Cubozoa and Scyphozoa) on the coast of Rio Grande do Norte state, Northeast of Brazil. Specimens were collected using trawl net on beaches in the counties of Natal (in 2003) and Tibaú (in 2004). For the Rio Grande do Norte coast there were few records of large jellyfish, and new records of the following cubozoan and scyphozoan species were verified: *Chiropsalmus quadrumanus*; *Chrysaora lactea*; *Lychnorhiza lucerna* and *Stomolophus meleagris*. The studied species had their distributions expanded in the coast to the State of Rio Grande do Norte.

Introduction
Cubozoa and Scyphozoa, both classes of Cnidaria, are composed mainly by large solitary marine invertebrates (Mianzan and Cornelius 1999). In these classes, the pelagic stage as a jellyfish is more conspicuous in the life cycle, while the polypoid form is restricted to a small sessile stage (Arai 1997). Currently, there are *ca.* 200 species in the Class Scyphozoa (distributed in 19 families and 50 genera), all of them exclusively marine (Kramp 1961; Mianzan and Cornelius 1999). Class Cubozoa constitutes a group with about 35 species, the jellyfishes having an umbrella with cubical outlines.

Studies concerning biogeography of jellyfishes are scarce, especially for the South Atlantic (Mianzan and Cornelius 1999; Segura-Puertas et al. 2003; Altuna 2008). Gershwin (2001) remarked that the confusing systematics of these animals contributes to this scarcity. Color differences, pigmentation patterns and slight anatomical variations guided the nominal description of species during the nineteenth century (Kramp 1961).

In the South Atlantic, Mianzan and Cornelius (1999), in a wide literature revision, listed 34 species of scyphozoans and 5 of cubozoans. For the entire Brazilian coast, there are 22 records of scyphozoans (Migotto et al. 2002; Marques et al. 2003). On the other hand, only about 35 species of cubozoans were described worldwide, four of them reported for the Brazilian coast (Migotto et al. 2002; Morandini 2003).

Marques et al. (2003) discussed the knowledge on Medusozoa (Cubozoa, Hydrozoa, Scyphozoa and Staurozoa) under a geographical and historical perspective for the Brazilian coast. A lack of knowledge was observed for some areas, where

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more studies should focus. The Northeast region of Brazil is the least known area in all biological aspects concerning medusozoans but Neumann-Leitão et al. (2008) recently reported the scyphozoan *Aurelia* sp. in state of Rio Grande do Norte.

The present contribution presents a preliminary survey on Scyphozoa and Cubozoa (Cnidaria: Medusozoa) of coastal waters in Rio Grande do Norte, increasing the knowledge on this group for the Northeastern states.

Material and methods

The material was collected on the coast of the state of Rio Grande do Norte, performed together with the fishermen of Natal beach (05°44'59.73" S, 35° 12'11.78" W), in 2003, and Tibaú beach (04°53'20.12" S, 37°13'26.77" W), in 2004, by trawl net. Large jellyfishes were submitted to fixation (using a solution of 4% formaldehyde in seawater) and later identified in Laboratory of Marine Invertebrates, *Universidade Federal do Ceará* (UFC).

The species *Chiropsalmus quadrumanus* (Müller, 1859), *Chrysaora lactea* Eschscholtz, 1829, *Lychnorhiza lucerna* Haeckel, 1880, and *Stomolophus meleagris* L. Agassiz, 1862 were identified following the key in Mianzan and Cornelius (1999), Morandini et al. (2005) and Gershwin (2006). The animals were deposited in the Cnidaria Collection of the *Departamento de Biologia* (LINCE-CNID), *Universidade Federal do Ceará*, Brazil. Classification of the species in families and higher taxa was based on Morandini et al. (2005).

Results and discussion

Phylum Cnidaria Verrill, 1865
Subphylum Medusozoa Petersen, 1979
Class Cubozoa Werner, 1973
Order Chirodropida Haeckel, 1880
Family Chiropsalmidae Thiel, 1936
Genus *Chiropsalmus* L. Agassiz, 1862

Chiropsalmus quadrumanus (Müller, 1859)
(Figure 1)
Tamoya quadrumana Müller 1859: 1-12.
Chiropsalmus quadrumanus L. Agassiz 1862: 174.
References for Brazil: Müller (1859: 1-12); Vannucci (1954: 120-122; 1957: 594-595); Mianzan and Cornelius (1999: 533); Migotto et al. (2002: 22); Morandini et al. (2005: 283); Morandini et al. (2006a: 2); Nogueira and Silva (2005); Nogueira and Haddad (2006); Nogueira and Haddad (2008).

Material: 5 jellyfishes, Brazil, Rio Grande do Norte, Natal, Redinha Beach (05°44'59.53" S, 35°12'10.96" W), coll. H. Matthews-Cascon, May 14, 2003 (LINCE-CNID#10 to 15).

Remarks: Distribution of the species comprehends the Atlantic coast of America (Mianzan and Cornelius 1999). It is very common in the Brazilian coast, being found in almost all States (Figure 1). It is associated with moderate accidents in the Brazilian coast (Haddad Jr. et al. 2002) and with a record of sudden death in Texas, USA (Bengston et al. 1991). Calder and Peters (1975) and Barnes (1966) studied aspects of the nematocysts and systematic of the species. According to a recently published revision of the genus *Chiropsalmus* (Gershwin 2006), it comprises 3 species: *Chiropsalmus quadrumanus* (Western Atlantic Ocean, Brazil to North Carolina, USA); the doubtful *Chiropsalmus zygonema* Haeckel, 1880 (Western Atlantic Ocean, Argentina); and the newly described *Chiropsalmus alipes* (Eastern Pacific Ocean, Zihuatenejo, Mexico).

Class Scyphozoa Goette, 1887
Subclass Discomedusae Haeckel, 1880
Order Semaeostomeae L. Agassiz, 1862
Family Pelagiidae Gegenbaur, 1856
Genus *Chrysaora* Péron & Lesuer, 1810
Chrysaora lactea Eschscholtz, 1829
(Figure 2)
Chrysaora lactea Eschscholtz, 1829: 81-82
Dactylometra lactea L. Agassiz, 1862: 126
Chrysaora hysoscella Vannucci, 1954: 123-146
Chrysaora quinquecirrha Goy, 1979: 291

Referentes for Brazil: Eschscholtz (1829: 81-82); Oliveira (1950: 369, 389); Vannucci (1954: 123-126; 1957: 594-595); Goy (1979: 291); Mianzan

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and Cornelius (1999: 538); Migotto et al. (2002: 23); Morandini et al. (2004); Morandini et al. (2005: 285); Nogueira and Silva (2005); Morandini et al. (2006a: 4); Morandini et al. (2006b); Nogueira and Haddad (2006).

Material: 1 young jellyfish, Brazil, Rio Grande do Norte, Tibaú Beach (4°50'13.13" S, 37°14'53.41" W), coll. M.O. Soares, March 10, 2004 (LINCE-CNID#16).

Remarks: Distribution comprehends Jamaica and the Atlantic coast of South America. *Chrysaora lactea* and *C. quinquecirrha* occur on the Atlantic coast of America; *C. lactea* occurs more to the South of the continent and *C. quinquecirrha* more to the North. Morandini et al. (2004) described the life cycle of the species *C. lactea*, which displays differences in the stages of development to other known life cycles of *Chrysaora* species. Morandini et al. (2006b) redescribed the species based on specimens from the South Atlantic and designating a neotype.

Order Rhizostomeae Cuvier, 1799
Family Lychnorhizidae Haeckel, 1880
Genus *Lychnorhiza* Haeckel, 1880
Lychnorhiza lucerna Haeckel, 1880
(Figure 3)
Lychnorhiza lucerna Haeckel, 1880: 587-588.
Cramborhiza flagellata Haeckel, 1880: 646.
Lychnorhiza flagellata Vanhöffen, 1888: 29, 42.

References for Brazil: Haeckel (1880: 587-588, 646); Vannucci (1951: 94-95; 1954: 128; 1957: 594-595); Mianzan and Cornelius (1999: 545-546); Silveira and Cornelius (2000: 14-15); Migotto et al. (2002: 23); Morandini et al. (2005: 286-287); Morandini et al. (2006a: 4); Nogueira and Haddad (2006).

Material: 9 jellyfishes, Brazil, Rio Grande do Norte, Tibaú Beach (04°50'13.13" S, 37°14'53.41" W), coll. M.O. Soares, March 11, 2004 (LINCE-CNID#17 to 25).
Remarks: The species is endemic for the Atlantic coast of South America (Mianzan and Cornelius, 1999). Silveira and Cornelius (2000) and Morandini et al. (2005; 2006a) discussed on the materials collected in Southern and Northeastern Brazil, respectively. The species is observed on the Brazilian shores, from Northeast to South. The species increase in numbers between October and March in southeastern estuarine areas (Morandini *pers. obs.*).

Family Stomolophidae Haeckel, 1880
Genus *Stomolophus* L. Agassiz, 1862
Stomolophus meleagris L. Agassiz, 1862
(Figure 4)
Stomolophus meleagris L. Agassiz, 1862: 138, 151.
Stomolophus agaricus Haeckel, 1880: 599.
Stomolophus fritillaria Haeckel, 1880: 598.
Stomolophus chunii Vanhöffen, 1888: 31, 42.
Stomolophus meleagris fritillaria Kramp, 1955: 165-166.

References for Brazil: Vannucci (1954: 126-128; 1957: 594-595); Mianzan and Cornelius (1999: 547); Migotto et al. (2002: 23); Morandini et al. (2005: 289); Morandini et al. (2006a: 5); Nogueira and Haddad (2006).

Material: 3 jellyfishes, Brazil, Rio Grande do Norte, Tibaú Beach (04°50'13.13" S, 37°14'53.41" W), coll. M. O. Soares, March 11, 2004 (LINCE-CNID#26 to 28).

Remarks: Its distribution comprehends both Atlantic and Pacific coasts of America. Calder (1982; 1983) described its life cycle in laboratory and made remarks on the nematocysts during different life stages. Bigelow (1914) recognized that all species of the genus should be synonymized with *S. meleagris*. Specimens from the Northern shores of South America were considered a distinct variety (*Stomolophus meleagris fritillaria*) (Kramp 1955).

Chiropsalmus quadrumanus, Chrysaora lactea, *Lychnorhiza lucerna* and *Stomolophus meleagris* are recorded for the first time to the state of Rio Grande do Norte, expanding the range of these species in Brazil and filling some gaps on the distribution in the Tropical South Atlantic as well.

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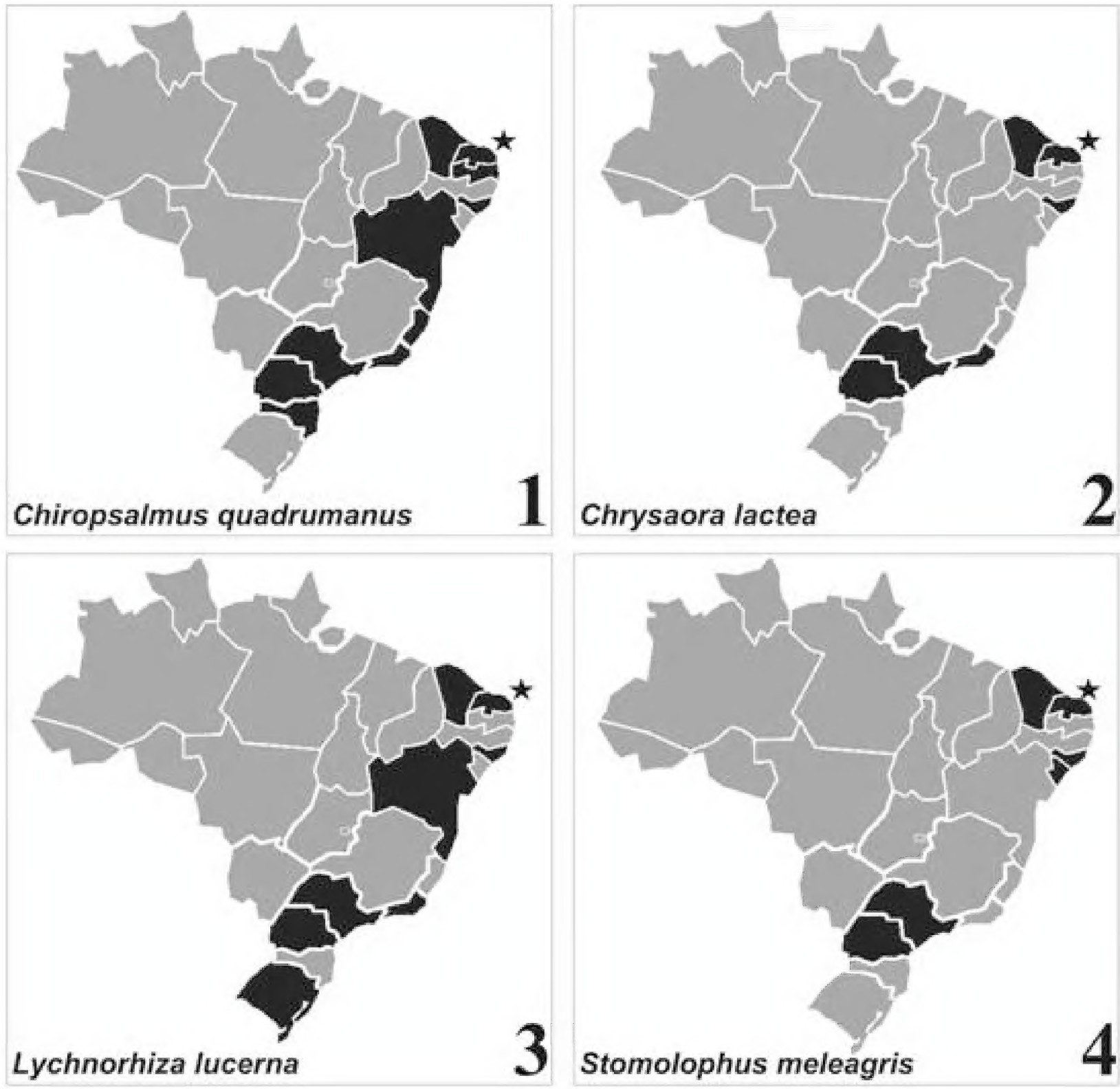

Figures 1-4. Records of the cubozoan and scyphozoan species in the Brazilian coast. The dark areas indicate the states in which the species was previously recorded. The star marks the new record of the species for the Rio Grande do Norte state.
1. *Chiropsalmus quadrumanus* (F. Müller, 1859).
2. *Chrysaora lactea* Eschscholtz, 1829.
3. *Lychnorhiza lucerna* Haeckel, 1880.
4. *Stomolophus meleagris* L. Agassiz, 1862.

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Literature cited

Altuna, A. 2008. Literature analysis and present state of knowledge of benthic Medusozoa (Cnidaria) from the Bay of Biscay and nearby areas (Northeastern Atlantic), with emphasis on biodiversity. Zootaxa 194: 1-15.

Arai, M. N. 1997. A Functional Biology of Scyphozoa. New York. Chapman and Hall. 316p.

Barnes, J. H. 1966. Studies on three venomous cubomedusae; p. 305-332 *In* The Cnidaria and their evolution. W. J. Rees (ed.). Symp. Zool. Soc. London 16.

Bengston, K., M. M. Nichols, V. Schnadig, and M. D. Ellis. 1991. Sudden death in a child following jellyfish envenomation by *Chiropsalmus quadrumanus*. Case report and autopsy findings. Journal of the American Medical Association 266:1404-1406.

Bigelow, H. B. 1914. Note on the medusan genus *Stomolophus,* from San Diego. University of California. Publications in Zoology 13 (10): 239-241.

Calder, D. R. and E. C. Peters. 1975. Nematocysts of *Chiropsalmus quadrumanus* with comments on the systematic status of the Cubomedusae. Helgoländer wiss. Meeresunters 27: 364-369.

Calder, D. R. 1982. Life history of the cannonball jellyfish, *Stomolophus meleagris* L. Agassiz, 1860 (Scyphozoa, Rhizostomida). Biological Bulletin 162:149-162.

Calder, D. R. 1983. Nematocysts of stages in the life cycle of *Stomolophus meleagris*, with keys to scyphistomae and ephyrae of some western Atlantic Scyphozoa. Canadian Journal of Zoology 61: 1185-1192.

Eschscholtz, F. 1829. System der Acalephen. Eine ausfürhrliche Beschreibung aller Medusenatirgen Strahltiere Ferdinand Dümmler. Berlim. 190 p.

Gershwin, L. 2001. Systematics and Biogeography of the Jellyfish *Aurelia labiata* (Cnidaria: Scyphozoa). Biological Marine Bulletin 201:104-119.

Gershwin, L. 2006. Comments on *Chiropsalmus* (Cnidaria: Cubozoa: Chirodropida): a preliminary revision of the Chiropsalmidae, with descriptions of two new genera and two new species. Zootaxa 1231: 1-42.

Goy, J. 1979. Campagne de la Calypso au large des côtes atlantiques del Amerique du Sud (1961-1962). Méduses. Résume scientifique de la campagne de la Calypso au large des côtes atlantiques del Amerique du Sud (1961-1962) 11: 263-296.

Haddad Jr, V., F. L. da Silveira, J. L. C. Cardoso, and A.C. Morandini. 2002. A report of 49 cases of cnidarian envenoming from southeastern Brazilian coastal waters. Toxicon 40(10): 1445-1450.

Haeckel, E. 1880. Das System der Medusen II, 2: System der Acraspeden. Berlim. Gustav Fischer Jena, 672p.

Kramp, P. L., 1955. A revision of Ernst Haeckel's determinations of a collection of medusae belonging to the Zoological Museum of Copenhagen. Deep-Sea Research 3: 149-168.

Kramp, P. L. 1961. Synopsis of the medusae of the world. Journal of the Marine Biological Association of the United Kingdom 40: 1- 469.

Marques, A. C., A. E. Migotto, and A.C. Morandini. 2003. Synopsis of Knowledge on Cnidaria Medusozoa from Brazil. Biota Neotropica 3(2):1-35.

Mianzan, H. W. and P. F. S. Cornelius. 1999. Cubomedusae and Scyphomedusae; p. 513-559 *In* Mianzan, H.W (ed.), South Atlantic Zooplankton. Leiden. Backhuys Publishers.

Migotto, A. E., A. C. Marques, A. C. Morandini, and F.L. da Silveira. 2002. Checklist of the Cnidaria Medusozoa of Brazil. Biota Neotropica 2(1): 1-35.

Morandini, A. C. 2003. Deep-Sea medusae (Cnidaria: Scyphozoa, Hydrozoa, Cubozoa) from the coast of Bahia (western South Atlantic, Brazil). Mitteilungen aus dem hamburgischen zoologischen Museum und Institut 100:13-25.

Morandini, A. C., F. L. da Silveira, and G. Jarms. 2004. The lyfe cycle of *Chrysaora lactea* Eschsholtz, 1829 (Cnidaria, Scyphozoa, Discomedusae, Semaeostomeae, Pelagiidae) with notes on the scyphistoma stage of tree other species. Hydrobiologia 530: 347-354.

Morandini, A. C., D. Ascher, S.N. Stampar, and J.F.V. Ferreira. 2005. Cubozoa e Scyphozoa (Cnidaria: Medusozoa) de águas costeiras do Brasil. Inheringia, Série Zoologia 95(3): 281-294.

Morandini, A. C., M. O. Soares, H. Matthews-Cascon, and A.C. Marques. 2006a. A survey of the Scyphozoa and Cubozoa (Cnidaria, Medusozoa) from the Ceará coast (NE Brazil). Biota Neotropica 6(2): 1-8.

Morandini, A. C., F. L. Da Silveira, and P.F.S. Cornelius. 2006b. Redescription of *Chrysaora lactea* Eschscholtz, 1829 (Cnidaria: Scyphozoa) from the Brazilian coast, with designation of a neotype. Zootaxa 1135: 29-48.

Müller, F. 1859. Zwei neue Quallen von Santa Catharina. *Tamoya haplonema* und *quadrumana*. Abhandlungen der Naturforschenden Gesellschaft in Halle 5: 1-112.

Neumann-Leitão, S., E. M. E. Sant'anna, L.M.O. Gusmão, D. A. Do Nascimento-Vieira, M.N. Paranaguá, and R. Schwanborn. 2008. Diversity and distribution of the mesozooplankton in the tropical Southwestern Atlantic. Journal of Plankton Research 30 (7): 795-805.

Check List **5**(1): 133–138, 2009.
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Nogueira Júnior, M. and J. L. Silva. 2005. Associações entre medusas (Cnidaria) e isópodos (Crustacea) nos litorais do Paraná e Santa Catarina, Brasil. Acta Biologica Paranaense 34 (1,2,3,4): 127-138.

Nogueira Júnior, M. and M. A. Haddad. 2006. Macromedusae (Cnidaria) from the Paraná Coast, Southern Brazil. Journal of Coastal Research 39: 1161-1164.

Nogueira Júnior, M. and M. A. Haddad. 2008. The diet of cubomedusae (Cnidaria, Cubozoa) in Southern Brazil. Brazilian Journal of Oceanography 56(3): 157-164.

Oliveira, L. P. H. 1950. Levantamento biogeográfico da Baia de Guanabara. Memórias do Instituto Oswaldo Cruz 48: 363-391.

Segura-Puertas, L., E. Suarez-Morales, and L. Celis. 2003. A checklist of the Medusae (Hydrozoa, Scyphozoa and Cubozoa) of Mexico. Zootaxa 194: 1-15.

Silveira, F. L and P. F. S. Cornelius. 2000. Novas observações sobre medusas (Cnidaria, Scyphozoa, Rhizostomeae) no Nordeste e Sul do Brasil. Acta Biologica Leopondelsia 22(1): 9 –18.

Vannucci, M. 1951. Hydrozoa e Scyphozoa existentes no Instituto Paulista de Oceanografia. Boletim do Instituto Oceanográfico 2(1): 67-98.

Vannucci, M. 1954. Hydrozoa e Scyphozoa existentes no Instituto Oceanográfico. Boletim do Instituto Oceanográfico 5(1-2): 95-149.

Vannucci, M. 1957. Distribuição de Scyphozoa nas costas do Brasil. Anais da Academia Brasileira de Ciências 29(4): 593-598.

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